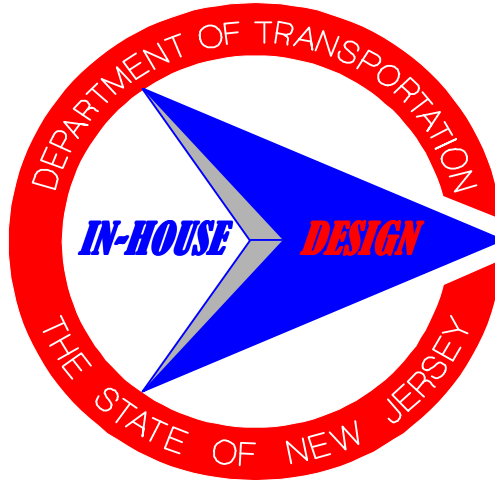


**NEW JERSEY  
DEPARTMENT OF TRANSPORTATION**



**ROUTE U.S. 130, RACCOON CREEK  
Logan Township  
Gloucester County  
Job# 0817504**

**PRELIMINARY DESIGN TEXT SUBMISSION**

**SEPTEMBER 2010**

**PREPARED BY: IN-HOUSE DESIGN**

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

## **I. PROJECT DESCRIPTION**

This project is referred to as Route U.S. 130, Raccoon Creek Bridge Replacement and Pavement Rehabilitation. The project is located in Logan Township in Gloucester County.

The purpose of this project is to replace the Raccoon Creek Movable Bridge and improve the roadway to enhance the safety on the Route U.S. 130 corridor. The superstructure is in poor condition due to the deteriorated state of the stringers, end floorbeams, and deck grating in the main span. The deck on all approach spans is in poor condition due to efflorescence, numerous cracking on top and underside of the slab, and several spalled areas of concrete with exposed and corroded reinforcing steel. The substructure is in poor condition due to heavy erosion of the slopes in front of both abutments. The east abutment's backwall displays large spalls and the west abutment has soil erosion beneath the cap wall.

Also, there are geometric and safety deficiencies within the project limits. There is a 0.25% vertical grade along Route U.S. 130 from M.P. 11.68 to M.P. 11.70, which is below the minimum required grade of 0.30%. This may not allow water to runoff the highway properly. Logan Township representatives noted that this section of Route U.S. 130 floods during heavy rain events.

There are two (2) vertical curves along Route U.S. 130 within the project limits that have insufficient lengths and stopping sight distances. They are located at M.P. 11.74 and M.P. 11.80. The vertical curve located at M.P. 11.80 is located on the Raccoon Creek Bridge. This crest vertical curve restricts the sight distance of motorist exiting Main Street onto Route U.S. 130.

The bridge operations building and the tower on the bridge inside the sight triangle also restrict intersection sight distance at Main Street.

Both Island Road and Main Street intersect Route U.S. 130 at skewed angles. They are of approximate 45° and 65°, respectively. The intersection skew angle at Island Road is less than the minimum of 60° recommended by the NJDOT-RDM. Because of the skews, trucks larger than a single unit (SU) cannot maneuver right turns onto either Island Road or Main Street from Route U.S. 130 without entering the opposing lanes of the minor streets.

The northbound outside lane, north of the bridge is 10.5 feet wide. This is below the minimum required width of 11 feet. The substandard northbound and southbound shoulders are 6 feet wide south of the Raccoon Creek Bridge, respectively. These widths are below the minimum required shoulder width of 8 feet.

The occasional flooding of Route U.S. 130 and the surrounding areas occurs due to tidal surges from the Delaware River during heavy storm events. The intensity and duration of the flooding is dependent on the type and characteristics of the storm. It was noted that the 10-year storm flood elevation of 8.4 feet± is above the roadway elevation of 6.6 feet± at this location.

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

The major elements of the proposed improvements include the following:

- The movable bridge over Raccoon Creek will be demolished. The proposed structure will be a fixed span bridge constructed on a new alignment offset to the west with a 25' vertical clearance from the mean high water elevation to the bottom of the superstructure.
- The proposed structure will be constructed offset to the west in order to maintain traffic during the duration of the project.
- Widening Route U.S. 130 to provide 12' lanes 8' outside and 3' inside shoulders.
- Retaining Walls will be constructed adjacent to Route U.S. 130 to minimize right-of-way and environmental impacts.
- Access to Route U.S. 130 from Island Road and Main Street will be eliminated. The intersection at Barker Avenue will provide access to Route U.S. 130.
- Main Street and Island Road will be linked. The proposed structure will extend beyond the local roads creating an overpass.
- The Route U.S. 130/Sheets Avenue unsignalized intersection will be eliminated. The existing intersection does not meet NJ State Highway Access Management Code regulations.
- An additional access road parallel to Route U.S. 130 will be provided from Sheets Avenue to Main Street for emergency services and adjacent residential access.

## **II. PUBLIC COMMUNITY INVOLVEMENT**

The New Jersey Department of Transportation's (NJDOT) Public Involvement Program for the Route U.S. 130 over Raccoon Creek Bridge Replacement Project has included outreach for over 2,000 residents in the study area.

Two (2) Public Information Centers (PICs) were held to present the proposed transportation improvements to the community and to solicit feedback from local residents. Forty-four residents attended the first PIC on February 23, 2005, and 29 residents attended the September 19, 2005 PIC. The PIC meetings followed an open-house format and included display boards and related handouts. Summaries of comments and feedback received during the PICs were prepared, and appropriate comments were incorporated into the design.

Through the PICs, the community was apprised of the various aspects of the proposed transportation improvements, including impacts to local land use that would result from any changes to the transportation network. The PICs featured an overview of existing environmental

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

conditions, a comparison of alternatives, a summary map of stakeholder input and anticipated costs/benefits for all improvements.

On December 19, 2006, a resolution was adopted by the Logan Township Council supporting the proposed project.

The following list of issues was requested by the Division of Project Planning & Development (DPPD) to be addressed during design and the Design Team's recommendations are shown in bold italic font:

- Providing for emergency vehicle access from Sheets Avenue to Route U.S. 130 northbound – ***This will be included in the project.***
- Local officials expressed concerns regarding the erosion of the creek bank along Island Road – ***The erosion of the creek bank along Island Road should be mitigated by the township since Island Road is a local roadway.***
- Context Sensitive Design Elements incorporated into the project – ***Context Sensitive Design Elements will be incorporated in the design.***
- Continued coordination with County officials regarding the proposed County Park located adjacent to the southbound corridor. Continued coordination with NJDEP-SHPO regarding the potentially historic nature of the existing bridge and adjacent potentially historic resources – ***On going.***
- Mayor and Council requested that at the time of contracting for this Project, the Mayor and Council of Logan Township be permitted to contact local Contractors and members of the workforce to be notified about the Project and to make them available to the Contractors bidding on this Project – ***Since the project will be affecting Island Road, the township will be provided a copy of the construction plan set for their review. For that, they will be aware of the status of the project. Only qualified contractors will be allowed to participate in the bidding.***

Consultation with NJHPO has been ongoing regarding potential impacts to cultural resources and NJHPO will continue to be involved in the development of mitigation measures, including the preparation of a Memorandum of Agreement (MOA). An additional Public Information Center will be held in the fall of 2010 to continue including the public in the project delivery process.

### **III. ENVIRONMENTAL DOCUMENTATION**

Dewberry-Goodkind, Inc. (Dewberry) performed a reconnaissance of the study corridor, a review of Federal and State records, and made inquiries with several State and municipal offices and bureaus regarding the natural resources within the study corridor.

#### **Environmental Permitting**

The Route U.S. 130 Bridge over Raccoon Creek project may require the following permits/approvals based on the development of the construction plans:

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

- NEPA Categorical Exclusion Documentation
- U.S. Coast Guard Bridge Permit
- U.S. Army Corps of Engineers Permits (Section 404 and Section 10)
- NJDEP Waterfront Development Permit/Coastal Wetland Permit
- NJDEP Freshwater Wetlands Letter of Interpretation Application
- NJDEP Freshwater Wetlands Individual or General Permit
- NJDEP Transition Area Waiver
- NJDEP Flood Hazard Area Riparian Mitigation/Timing Restrictions
- Tidelands Conveyance Instrument
- New Jersey No Net Loss Reforestation Act
- Soil Erosion and Sediment Control Plan

A pre-application meeting with the NJDEP is recommended to review and confirm the permit submittals that will be required.

## **Surface Water**

Raccoon Creek is a tidal watercourse that flows in a northwesterly direction of the Delaware River, located approximately 1.5 miles away. The creek is located in the NJDEP Watershed Management Area 18 (WMA-18) and drains central Gloucester County. The creek is classified as FW2-NT/SE2 and is not suitable for trout. The SE2 classification indicates that the portion of Raccoon Creek in the project study area is classified as saline waters of estuaries, or an area that has both fresh water and saline water influences. The proposed bridge replacement is a Fixed Span with retaining walls and would maintain a minimum vertical clearance of 25 feet above mean high tide over Raccoon Creek.

## **Sole Source Aquifer**

The project study area is located within the Coastal Plain Sole Source Aquifer of NJ. However, no impacts to the aquifer are anticipated from the proposed road, drainage, and bridge work.

## **Stormwater**

The drainage design for the proposed project has been developed and includes two stormwater basins. On the south/west side of Raccoon Creek, along northbound Route U.S. 130, a linear infiltration basin is proposed where the existing Route U.S. 130 pavement is to be removed. To the north/east of Raccoon Creek, the NJDOT proposes to construct an extended detention basin in an existing ramp infield between eastbound Route U.S. 322 and southbound Route U.S. 130. A net increase in impervious area will result from the proposed project. This increase in impervious area will increase the stormwater runoff, which will be treated with the implementation of the proposed stormwater basins. No water quality changes are anticipated as a result of the project.

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

## **Floodplains**

The channelized ditch located within the northwest quadrant, parallel to Route U.S. 130, is within the 100-year floodplain. The entire southwest quadrant of the project study area, including Route U.S. 130 itself, also is within the 100-year floodplain. Areas adjacent to Raccoon Creek in the southeast quadrant are mapped as within the 100-year floodplain. The northeast quadrant is mapped as within the 500-year floodplain, and an area to the northeast of the project area is mapped as within the 100-year floodplain.

## **Tidelands/Riparian**

There are areas claimed by the State of New Jersey within the project study area.

## **Soils**

No acid-producing soils are located within the project study area. Hammonton loamy sand (HbmB), located in the northeast quadrant, is listed as a hydric soil. Disturbance of soil material may increase the potential for short-term erosion and sedimentation, including turbidity in adjacent surface waters. Construction activities would be conducted pursuant to an approved Soil Erosion and Sediment Control Plan and, therefore, are not expected to result in significant impacts. Any excavated areas that require backfill would be filled with clean soil meeting NJDOT standards, as well as NJDEP requirements as set forth in the Technical Requirements for Site Remediation. Although the possibility exists for encountering contaminated soils within the study area due to historic fill, appropriate mitigation measures would be undertaken to ensure that backfill material would not be contaminated. Review of NJDEP known contaminated sites database and EDR did not identify any hazardous sites in the study area and therefore no impacts from hazardous materials of waste sites are anticipated.

## **Wetlands**

A wetland delineation of the project area was conducted on April 13, 2010. Dewberry observed and delineated wetland areas in the northwest and southwest quadrants of the study area using the methodologies outlined in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, as required by the NJDEP regulations. The wetland delineation identified deciduous scrub/shrub wetlands, as well as modified agricultural wetlands, in the northwest quadrant of the study area. In the southwest quadrant of the project area, a peninsula of forested wetlands was identified. The delineation also identified tidal marsh area in the southwest portion of the study area, extending southwest from the Route U.S. 130 Bridge and beyond the southwest limits of the project study area. The wetlands identified within the study area are coastal wetlands and can be assigned up to a 300-foot buffer. Any freshwater wetlands within the study area are expected to be classified as Exceptional Resource Value and a 150-foot wide transition zone is anticipated to be assigned by the NJDEP, based on the presence of an endangered species in the area, i.e. the shortnose sturgeon.

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

## **Threatened and/or Endangered Species**

In a letter dated December 17, 2009, the NJDEP Natural Heritage Program reported that the Natural Heritage Database and the Landscape Project habitat mapping shows that the project study area lies within the foraging and habitat area of the state endangered bald eagle (*Haliaeetus leucocephalus*). The Natural Heritage Program also reported the state candidate listed great blue heron (*Ardea herodias*) and the federally endangered shortnose sturgeon (*Acipenser brevirostrum*) utilizes the project study area. As part of the Flood Hazard Area Control Act (FHACA) rule application, records for all rare plant species and ecological communities within the project area and within 1 mile downstream are also reported by the Natural Heritage Program. The occurrence of “freshwater tidal marsh complex” is reported for potentially occurring within the project study area.

In a letter dated February 5, 2010, the National Marine Fisheries Service (NMFS) reported that no species listed by NMFS occur in Raccoon Creek. Accordingly, no further coordination with NMFS’ Protected Resource Division (PRD) is necessary.

In-water work will likely be required for the proposed construction/demolition of the proposed/existing bridges over Raccoon Creek. Seasonal restrictions on in-water work may be necessary for Raccoon Creek during spawning of the short-nose sturgeon. The NJDEP Flood Hazard Area Control Rules prohibit activities during designated time periods for waters with fishery resources. Raccoon Creek also is listed under the anadromous waters classification and the prohibited time period (inclusive) is March 1 through June 30 and September 1 through November 30 of each year.

The U.S. Fish and Wildlife Service (USFWS) review process is limited to projects which may affect federally listed species. Pursuant to the USFWS instructions in a response dated December 12, 2005 to an online inquiry, with the exception of an occasional transient bald eagle, no other federally listed or proposed endangered or threatened flora or fauna under USFWS jurisdiction are known to occur within the vicinity of the proposed project site. The response also refers to the current county/municipal lists available on the USFWS website for review. A review of the Logan Township, Gloucester County list was conducted on January 27, 2010 for the project study area. In Logan Township, Gloucester County, a potential for the occurrence of the bog turtle (*Glyptemys muhlenbergii*) is reported, and an historic occurrence of sensitive joint-vetch (*Aeschynomene virginica*) is reported for the municipality.

No suitable bog turtle habitat or sensitive joint-vetch was observed in the project study area during our December 2009 site visit. The project study area consists of tidally influenced waters; no freshwater areas with mucky, micro-topography, which is required by the bog turtle, were observed. Furthermore, no sensitive joint-vetch was identified during our site investigation, and none is believed to be present in the area, due to the discharge of dredged materials and the dominance of invasive plants found within the project study area, specifically Japanese knotweed and common reed inhabiting the banks along the waterway.

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

## **Air/Noise**

Analysis is currently being conducted.

## **Hazardous Waste**

As part of the hazardous waste screening, Dewberry performed a reconnaissance of the study corridor, a historical records review, a review of federal and state records, and made inquiries with several state and municipal offices and bureaus regarding properties, businesses, and cases within the study corridor. Based on a review of aerial photographs and Sanborn Fire Insurance maps, three historical sites of potential environmental concern were identified. No businesses were identified within the study corridor based on site reconnaissance and records review efforts. The site reconnaissance identified a groundwater monitoring well within the project study corridor, which was later found to be associated with potential groundwater contamination from a 550-gallon diesel Underground Storage Tank (UST) removed from the Bridgeport Bridge house. A Draft Hazardous Waste Screening (Dewberry 2010) presents the findings of the hazardous waste screening and makes specific recommendations for further study, including soil and groundwater sampling and analysis for right-of-way and easement acquisition and construction support purposes. In addition, further studies are also recommended to verify the presence and quantities of asbestos containing material and lead-based paint on the structures affected by the project and to develop an approach to address these issues during construction.

## **Section 4(f) Properties**

Three Section 4(f) resources are located in the project area: the Route U.S. 130 Bridge over Raccoon Creek; the Bridgeport Historic District; and the Gloucester County Improvement Authority Dream Park (Equestrian Park). The bridge received a SHPO Opinion of Eligibility from the New Jersey Historic Preservation Office (NJHPO) on April 20, 1999. The proposed project will result in the demolition of this bridge and a new replacement bridge will be constructed. Therefore, the proposed project constitutes a Section 4(f) impact.

The bridge is located northwest of the Village of Bridgeport. Based on the findings of a Historic Architectural Resources Technical Environmental Study (Dewberry 2010), the Bridgeport Historic District (located southeast of the existing Route U.S. 130 Bridge over Raccoon Creek) is eligible for listing in the National Register. Although the proposed project will result in an adverse effect to the district, it is currently suggested that this impact will not constitute a “constructive use” pursuant to Section 4(f). FHWA approval is necessary to conclude that substantial impairment will not occur. If FHWA concurs, no additional Section 4(f) evaluation for the Bridgeport Historic District is necessary.

The Gloucester County Improvement Authority Dream Park, located northwest of the Route U.S. 130 Bridge over Raccoon Creek, will be impacted by a minor strip taking. It is currently proposed that impacts to the park are covered under a de minimis Evaluation of Impacts. This

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

determination is based on the small acreage impact and the ability of the park to continue its present use. FHWA approval is also necessary to obtain this finding.

## **Cultural Resources**

The Area of Potential Effects for this project was approved by the State Historic Preservation Officer (Department of Environmental Protection) on July 1, 2010. And archaeological resource survey entitled Combined Phase I and II Archaeological Investigation, Route U.S. 130 Bridge over Raccoon Creek, Bridge Replacement Project, Logan Township, Gloucester County, New Jersey was submitted by Dewberry-Goodkind, Inc. in April 2010. An architectural resources survey entitled Historic Architectural Resources, Technical Environmental Study, New Jersey Department of Transportation, Route U.S. 130 Bridge over Raccoon Creek (M.P. 11.8), Logan Township, Gloucester County, New Jersey was submitted by Dewberry-Goodkind, Inc. in July 2010. The two cultural resources surveys are presently being reviewed by the Bureau of Environmental Program Resources. The surveys have identified two architectural cultural resources as eligible for inclusion in the National Register of Historic Places: the Raccoon Creek Bridge (SHPO Opinion: 04/20/99, and the Bridgeport Historic District. The cultural resources surveys have also identified that the proposed project will result in an Adverse Effect to both cultural resources. A Revised historic architectural survey will be submitted to FHWA for approval. Subsequently, the survey will be submitted to the SHPO for Section 106 comments on eligibility and effect. As neither of the properties are listed on the New Jersey State Register of Historic Places, an Application for Project Authorization under the New Jersey of Historic Places Act will not have to be submitted to the Historic Preservation Office.

## **IV. DESIGN CRITERIA**

### **A. Roadway Design Criteria**

- a. Functional Classification: Divided, Rural Minor Arterial (DM)
- b. Design Speed: Rt. U.S. 130 - 65MPH (new alignment), posted Speed 55 mph
- c. Design Vehicle: Rt. U.S. 130 - Semitrailer Large (WB-62), Island Road - Car & Boat Trailer P/B
- d. Maximum Superelevation Rate: 4%
- e. English/Metric Design: English

### **B. Traffic Design Criteria and Pavement Design Criteria**

	Construction Year (2008)	Construction Year (2031)
ADT	11,100 vpd (two-way)	42,402 vpd (two-way)
DHV	1,221 vph (two-way)	4,664 vph (two-way)
DD	53%	53%
% Trucks	8%	8%
LOS	A	A

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

## **C. Bridge Design Criteria**

- a. Design Loading – AASHTO LRFD HL-93 or NJ Permit Vehicle vehicular live loading, whichever governs
- b. Operational Importance Factor – NHS Structures (operational importance)  $n=1.05$
- c. Seismic Bridge Classification – Seismic Design Category “B”
- d. Vessel Impact Classification – AASHTO Article 3.14.1
- e. Under-clearances
  - i. Highway - 14’ 6” for Island Road (township road)
  - ii. Railroad - N/A
  - iii. Waterway - Navigable, 25’ high

## **D. Pavement Design Criteria**

- a. Traffic Volumes – 11,100 vpd (one-way 2008), 42,402 vpd (one-way 2031)
- b. % of Light and Heavy Trucks - 11%
- c. 18 kip Load Equivalency Factors (Heavy Trucks) – Flexible – 8.04
- d. Life Cycle – 20 years
- e. Directional and Lane Distribution Factors – 53%

## **E. Construction Specifications**

- a. Standard 2007 English

## **V. DESIGN STANDARDS**

### **A. AASHTO – except where superseded by NJDOT standards**

- 1. A Policy on Geometric Design of Highways and Streets
- 2. Highway Definitions
- 3. Roadside Design Guide
- 4. AASHTO Guide for the Design of Pavement Structures
- 5. AASHTO Manual on Subsurface Investigations
- 6. AASHTO LRFD Bridge Design Specifications, 5th Edition, 2010
- 7. AASHTO/AWS Bridge Welding Code D1.5 with NJDOT amendments

### **B. NJDOT**

- 1. Roadway Design Manual
- 2. Road User Cost Manual
- 3. Survey Manual
- 4. Access Management Code
- 5. Guideline: Designer Requirements for Revocations, Modifications and Adjustments of Access
- 6. Maintenance Manual

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

7. Design Manual for Bridges & Structures,
8. Design Exceptions Manual
9. Pavement Design Manual (AASHTO Companion)
10. Soil Erosion and Sediment Control Standards
11. Standard Specifications for Road and Bridge Construction
12. Standard Roadway Construction/Traffic Control/ Electrical/ Bridge Construction Details
13. Sample Plans
14. CADD Manual
15. Context Sensitive Design Policy
16. Context Sensitive Design Training Manual
17. Procedures Manual
18. Construction Schedule Manual
19. Utility Accommodation Policy
20. Right of Way Manual

## **C. OTHERS**

1. TRB Highway Capacity Manual
2. Manual on Uniform Traffic Control Devices
3. American Society for Testing and Materials
4. FHWA Federal-Aid Policy Guide (FAPG)
5. NJDEP Technical Manual for Stream Encroachment Permits
6. TR-55, Urban Hydrology for Small Watersheds
7. American Standard for Nursery Stock, American Association of Nurserymen, Inc.
8. Hortus III
9. Hydraulic Engineering Circular No. 18, "Evaluating Scour at Bridges"

## **VI. DESIGN ELEMENTS**

### **A. Geometrics**

#### **1. Vertical Geometry**

The vertical geometry on Route U.S. 130 will be raised to meet the elevation of the proposed fixed span bridge over Raccoon Creek. The grade rate north and south of the Creek is -2.975% and 2.72% respectively.

#### **2. Horizontal Geometry**

The horizontal alignment will be shifted to the west in order to maintain traffic along Route U.S. 130 during construction and minimize the residential right of way impacts.

#### **3. Highway Sections**

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

The cross section on Route U.S. 130 will include two 12 foot lanes in each direction of travel with minimum 8 foot outside shoulders and 3 foot inside shoulders separated by either a concrete median barrier or guide rail. The typical section will vary in the vicinity of the acceleration and deceleration lanes proposed along Route U.S. 130 for Route U.S. 322 interchange.

## **B. Pavement Engineering**

### Full Depth Pavement (New Pavement Composition)

Route U.S. 130 (travel lane and shoulders) including acceleration and deceleration lane

- 3" Hot Mix Asphalt 12.5M76 Surface Course.
- 4" Hot Mix Asphalt 19M64 Intermediate Course.
- 5" Hot Mix Asphalt 25M64 Base Course.
- 10" Dense Graded Aggregate Base Course.
- Geotextile, Roadway Stabilization.
- 10" Subbase.

Ramps connecting Route U.S. 130 & Route U.S. 322 (travel lane and shoulders)

- 2" Hot Mix Asphalt 12.5M76 Surface Course.
- 4" Hot Mix Asphalt 19M64 Intermediate Course.
- 5" Hot Mix Asphalt 25M64 Base Course.
- 10" Dense Graded Aggregate Base Course.
- Geotextile, Roadway Stabilization.
- 10" Subbase.

Secondary Roads (Main Street, Island Road and firehouse connector)

- 2" Hot Mix Asphalt 12.5M64 Surface Course.
- 5" Hot Mix Asphalt 25M64 Base Course.
- 6" Dense Graded Aggregate Base Course.
- 6" Subbase.

### Mill and Pave Section

Route U.S. 130

Mill up to 1" depth and pave with 3" Hot Mix Asphalt 12.5M76 Surface Course

Secondary Roads

Mill up to 2" depth and Pave with 2" Hot Mix Asphalt 12.5M64 Surface Course.

Note- At both ends of the approach of Route U.S. 130, break the existing pavement to accommodate new pavement.

### Incidental Recommendations

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

- The areas exhibiting moderate to severe fatigue cracking, patching, and potholes should be repaired in accordance with division 400 & 450 of the 2007 Standard Specifications book. Include the standard item “Hot Mix Asphalt Pavement Repair and Concrete Pavement Repair prior to overlay.”
- Saw cutting of existing pavement prior to excavation and sealing of joints must be done between the new and existing pavement section to remain.
- Excavate and replace any unstable material with Subbase which is Subbase I-3.

## C. Geotechnical Design

A geotechnical investigation was limited to a review of New Jersey Department of Transportation pavement data tested in September 2004. The following table provides a summary of this data:

### Pavement Data –Route U.S. 130

Direction	MP From	MP To	IRI	NJ IRI Guidelines	SDI	NJ SDI Guidelines	Roadway Condition on Deficient Portion	Avg. Rut Depth
Northbound	10.5	10.6	175	Deficient	3.8	Good	Rough Only	0.16
Northbound	10.6	10.7	201	Deficient	3.8	Good	Rough Only	0.12
Northbound	10.7	10.8	186	Deficient	3.8	Good	Rough Only	0.14
Northbound	10.8	10.9	272	Deficient	4.1	Good	Rough Only	0.1
Northbound	10.9	11.0	318	Deficient	5.0	Good	Rough Only	0.13
Northbound	11.0	11.1	259	Deficient	5.0	Good	Rough Only	0.05
Northbound	11.1	11.2	363	Deficient	4.0	Good	Rough Only	0.08
Northbound	11.2	11.3	305	Deficient	3.9	Good	Rough Only	0.17
Northbound	11.3	11.4	337	Deficient	3.9	Good	Rough Only	0.11
Northbound	11.4	11.5	252	Deficient	3.9	Good	Rough Only	0.27
Northbound	11.5	11.6	153	Mediocre	3.9	Good		0.21
Northbound	11.6	11.7	166	Mediocre	3.9	Good		0.31
Northbound	11.7	11.8	276	Deficient	3.9	Good	Rough Only	0.07
Northbound	11.8	11.9	328	Deficient	4.7	Good	Rough Only	0.03
Northbound	11.9	12.0	135	Mediocre	4.9	Good		0.1
Northbound	12.0	12.1	166	Mediocre	2.7	Mediocre		0.14
Northbound	12.1	12.2	286	Deficient	2.5	Deficient	Rough & Distressed	0.19
Northbound	12.2	12.3	199	Deficient	2.4	Deficient	Rough & Distressed	0.12
Northbound	12.3	12.4	171	Deficient	2.4	Deficient	Rough &	0.13

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

Project UPC#: 983440

Project #: 0817504

Direction	MP From	MP To	IRI	NJ IRI Guidelines	SDI	NJ SDI Guidelines	Roadway Condition on Deficient Portion	Avg. Rut Depth
							Distressed	
Northbound	12.4	12.5	120	Mediocre	2.4	Deficient		0.08
Northbound	12.5	12.6	163	Mediocre	2.4	Deficient		0.08
Northbound	12.6	12.7	118	Fair	2.4	Deficient		0.15
Northbound	12.7	12.8	179	Deficient	2.4	Deficient	Rough & Distressed	0.16
Northbound	12.8	12.9	197	Deficient	2.4	Deficient	Rough & Distressed	0.16
Northbound	12.9	13.0	173	Deficient	2.4	Deficient	Rough & Distressed	0.12
Southbound	10.5	10.6	115	Fair	2.8	Mediocre		0.26
Southbound	10.6	10.7	114	Fair	2.8	Mediocre		0.22
Southbound	10.7	10.8	108	Fair	2.8	Mediocre		0.18
Southbound	10.8	10.9	118	Fair	3.8	Good		0.18
Southbound	10.9	11.0	312	Deficient	4.2	Good	Rough Only	0.24
Southbound	11.0	11.1	365	Deficient	2.4	Deficient	Rough & Distressed	0.27
Southbound	11.1	11.2	462	Deficient	2.6	Mediocre	Rough Only	0.4
Southbound	11.2	11.3	269	Deficient	2.7	Mediocre	Rough Only	0.44
Southbound	11.3	11.4	276	Deficient	2.8	Mediocre	Rough Only	0.29
Southbound	11.4	11.5	263	Deficient	2.8	Mediocre	Rough Only	0.33
Southbound	11.5	11.6	247	Deficient	2.8	Mediocre	Rough Only	0.45
Southbound	11.6	11.7	300	Deficient	4.2	Good	Rough Only	0.34
Southbound	11.7	11.8	418	Deficient	5.0	Good	Rough Only	0.17
Southbound	11.8	11.9	184	Deficient	5.0	Good	Rough Only	0.14
Southbound	11.9	12.0	266	Deficient	5.0	Good	Rough Only	0.25
Southbound	12.0	12.1	0	Good	0.0	Deficient		0
Southbound	12.1	12.2	0	Good	0.0	Deficient		0
Southbound	12.2	12.3	422	Deficient	2.7	Mediocre	Rough Only	0.2
Southbound	12.3	12.4	308	Deficient	2.7	Mediocre	Rough Only	0.26
Southbound	12.4	12.5	303	Deficient	2.7	Mediocre	Rough Only	0.18
Southbound	12.5	12.6	195	Deficient	2.7	Mediocre	Rough Only	0.06
Southbound	12.6	12.7	205	Deficient	2.7	Mediocre	Rough Only	0.08
Southbound	12.7	12.8	207	Deficient	2.7	Mediocre	Rough Only	0.15
Southbound	12.8	12.9	134	Mediocre	2.7	Mediocre		0.1
Southbound	12.9	13.0	208	Deficient	2.5	Deficient	Rough & Distressed	0.16

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

In the table above, the IRI is the International Roughness Index and the SDI is the Surface Distress Index.

The indices for the IRI and SDI are based on the following ratings:

<b>Condition Status</b>	<b>IRI, (in/mi)</b>	<b>SDI</b>
<b>Deficient (Poor)</b>	<b>Above 170</b>	<b>0 - 2.5</b>
<b>Mediocre</b>	<b>120 - 170</b>	<b>2.6 - 3.0</b>
<b>Fair</b>	<b>95 - 119</b>	<b>3.1 - 3.4</b>
<b>Good</b>	<b>0 - 94</b>	<b>3.5 - 5.0</b>

Based on the above ratings, an analysis was performed on the deficient pavement based on the criteria listed below:

Rough Only: Road segments with excessive roughness ( $IRI > 170$ ) but without severe distress ( $SDI > 2.5$ ).

Distressed Only: Road segments with severe distress ( $SDI \leq 2.5$ ) but without excessive roughness ( $IRI \leq 170$ ).

Rough and Distressed: Road segments with excessive roughness ( $IRI > 170$ ) and severe distress ( $SDI \leq 2.5$ ).

Subsurface exploration program and geotechnical engineering evaluation have been performed in connection with the replacement of the U.S. Route 130 Bridge over Raccoon Creek.

The subsurface conditions encountered north of Raccoon Creek consisted of granular soils composed predominantly of coarse to fine sand intermixed with varying amounts of silt and gravel. The subsurface conditions encountered on the south side of Raccoon Creek consisted of granular soils underlain by marine tidal marsh deposits and geologically older marine granular soils.

Deep foundation elements consisting of driven closed-end concrete filled pipe piles are recommended to support the abutments and three piers of the reconstruction of the U.S. Route 130 Bridge over Raccoon Creek. Due to the presence of soft compressible soils at the south approach embankment, it is recommended that column-supported embankment be utilized such that the applied embankment and vehicular loads are transferred directly to the underlying dense granular soils. The construction of approach embankments will require that retaining walls be installed and mechanically stabilized earth (MSE) wall system such as manufactured by Reinforced Earth is recommended for the use in this project.

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

Please refer to the Subsurface Exploration & Geotechnical Engineering Evaluation Report dated August 2010 for more detailed information.

## **D. Survey Parameters**

The base mapping for this project was developed through a combination of aerial photogrammetry and conventional surveying methods. The aerial photogrammetry work was performed by BAE Systems ADR, 124 Gather Drive, Suite 100, Mt. Laurel, NJ 08054. The primary GPS horizontal and vertical control survey data was provided by the N.J.D.O.T. Geodetic Survey Unit.

The aerial photogrammetric portion consists of two segments, one high level flight, stations: HV 1 to HV 10, for mapping of adjacent wetlands and environmentally sensitive areas, southwest of the existing vertical lift bridge and one low level flight, stations HV 11 to HV 47 for mapping of existing road surface and surrounding topography.

Two primary GPS control stations were established and utilized as base-stations in preparation for performing Real-Time Kinematic (RTK) GPS surveying on forty seven (47) photo control stations.

Observations for the primary survey control were performed on one day, November 16, 2007 (Julian day 320). Two 60-minute sessions were observed. Observations for the photogrammetric survey control were performed on two days: November 28, 2007 (Julian day 332) and January 23, 2008 (Julian day 023).

Point of Contact:

## **PROJECT DESIGN, ANALYSIS AND PROCESSING**

Frederick A. Czepiga and Ronald J. Kuzma  
NJDOT Geodetic Survey Section  
P.O. 615 (Thiokol Building 6)  
1035 Parkway Avenue, Trenton, NJ 08625  
Telephone: (609) 530-5665

## **PHOTOGRAMMETRIC CONTACT**

Andrew F. Pickford, Regional Manager  
BAE SYSTEMS, ADR Mission Solutions  
124 Gather Drive  
Suite 100  
Mt. Laurel, NJ 08054  
Telephone: (856) 866-9700

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

## BASELINE ESTABLISHMENT

The field work for the establishment of the baseline was conducted by N.J.D.O.T. Survey South. All field data was acquired electronically and downloaded at the Cherry Hill Regional Survey Office. The file name for the "Baseline" is ebase\_f.dgn and ebase1\_f, the directory is "Design Projects by Route\Route 130\13001101 Rt 130 over Raccoon Creek MP 11.43 to 12.08\Field Survey".

### Point of Contact:

Chris Otani  
Acting Supervising Engineer, Survey South  
1 Executive Campus  
Route 70 West  
Cherry Hill, New Jersey 08002-4106  
Telephone: (856) 486-6623

A First-Order GPS Control Survey providing Horizontal and Vertical control was supplied by NJDOT, Division of Design Services, Bureau of Civil Engineering Geodetic Survey Unit.

A loop bench run was performed utilizing a Leica NA 2002 Digital Level, Mfr. Serial No. 309990, N.J.D.O.T. No. 107436, serviced and calibrated on 02/13/08.

Additional Cross Sections and Topography were provided in areas which could not be obtained through Photogrammetry. Directions and distances were observed utilizing two Leica TRC 1103 Electronic Total Stations, Mfr. Serial No. 619623, and 619621, N.J.D.O.T. No. 107419, and 107418, serviced and calibrated on 07/13/09.

NJDOT Control Monuments and existing property corners were uncovered and located for the purpose of associating the Route U.S. Existing Baseline with the newly obtain Photogrammetric Survey.

## PROJECT STATIONS \*

SOURCE : National Geodetic Survey NSRS Database Retrieval-11/16/2007

STATION	PID	(NAD 83) LATITUDE	(NAD 83) LONGITUDE	(NAV 88) HEIGHT
NJGC CORS ARP	DF8717	39° 46' 52.79170"	75° 07' 11.25056"	N/A
8 K 1	A14363	39° 49' 45.50010"	75° 17' 05.93207"	1.474
8 D 1	A14356	39° 43' 24.10511"	75° 13' 29.01853"	25.419
A 100	JU2203	39° 40' 20.64304"	75° 30' 08.16191"	4.050
BRIDGEPORT 1	JU4011	39° 47' 49.95501"	75° 20' 33.90080"	5.7

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

\* Project stations were borrowed from “Bridge Replacement & Roadway Improvements” report compiled and written by Frederick A. Czepiga, PLS, and Ronald J. Kuzma, PLS.

## VERTICAL DATUM

Orthometric heights (U.S. Survey Foot) as shown in the above table were held.

Listed below are the bench marks set for the project.

Description	Station	Offset	(NAV 88) Adjusted Elevation
HV11	712+41.74	60.10' L, Rt.130 BL	14.188
HV12	715+37.35	60.51' R, Rt. 130 BL	12.328
HV16	722+59.69	29.63' R, Rt. 130 SB BL	8.569
HV 17	725+29.91	18.36' L, Rt. 130 NB BL	12.371
HV 18	728+54.02	19.61' R, Rt. 130 SB BL	14.54
HV 20	731+33.75	28.07' L, Rt. 130 NB BL	14.609
HV21	719+29.87	51.26' Rt. Rt.130 BL	13.015
HV22	722+44.00	28.37' L, Rt.130 BL	11.713
HV23	721+71.44	361.41' R, Rt.130 BL	8.023
HV24	725+17.88	37.41' L, Rt.130 BL	12.073
HV25	724+37.49	242.55' L, Rt.130 BL	14.555
HV26	728+86.22	29.41' L, Rt.130 BL	10.335
HV27	732+29.20	27.33' R, Rt.130 BL	5.307
HV28	734+91.32	34.26' L, Rt.130 BL	5.157
HV29	738+31.35	35.08' R, Rt.130 BL	5.065
HV30	740+89.94	34.83' L, Rt.130 BL	4.469
HV31	744+33.26	36.58' R, Rt.130 BL	4.050
HV32	746+88.56	35.00' L, Rt.130 BL	4.926
HV33	750+30.81	35.30' R, Rt.130 BL	5.633
HV34	752+86.75	35.55' L, Rt.130 BL	4.732
HV35	756+29.59	37.03' R, Rt.130 BL	4.462
HV36	758+58.84	35.14' L, Rt.130 BL	4.960
HV37	762+27.64	41.05' R, Rt.130 BL	5.784
HV38	764+84.16	35.71' L, Rt.130 BL	7.975
HV39	768+38.30	56.44' R, Rt.130 BL	8.928
HV40	769+75.29	199.35' L, Rt.130 BL	5.842
HV41	774+37.81	39.44' R, Rt.130 BL	7.351
HV42	727+64.61	334.34' R, Rt.130 BL	8.347
HV43	734+39.32	254.35' R, Rt.130 BL	7.803
HV44	741+56.81	201.31' R, Rt.130 BL	8.635
HV45	744+49.73	256.00' R, Rt.130 BL	8.535

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

HV46	764+53.64	191.93' R, Rt.130 BL	10.614
HV47	752+54.53	207.04' R, Rt.130 BL	8.454

\* Vertical datum were borrowed from "Bridge Replacement & Roadway Improvements" report compiled and written by Frederick A. Czepiga, PLS, and Ronald J. Kuzma, PLS.

## METHOD FOR EXISTING BASELINE ESTABLISHMENT

Reference Plans & Documents are listed below:

- a.) N.J.D.O.T. As-built Construction Plans, Route U.S. 130, Section 4E, Resurfacing
- b.) N.J.D.O.T. Construction Plans, Route 44, Section 8
- c.) N.J.D.O.T. Construction Plans, Route 44, Section 10
- d.) N.J.D.O.T. Construction Plans, Route 44, Section 10A
- e.) N.J.D.O.T. Construction Plans, Route 44, Section 16B & 8A
- f.) N.J.D.O.T. 2005 Straight Line Diagrams
- g.) Delaware Port Authority Chester-Bridgeport Bridge Plans

Existing monuments found is listed below:

Point No.	Northing	Easting	Station	Offset	Baseline	Description
1	354042.5871	253038.1504	727+94.29	69.34' L	N.B. Rt. 130	Property Monument
2	353935.8229	252901.8057	729+56.37	138.85' L	N.B. Rt. 130	Iron Pipe
3	353925.0798	252752.7630	731+02.94	109.75' L	N.B. Rt. 130	Iron Pipe
4	354033.3461	252655.9007	716+69.65	0.29' R	Rt. 130	NJDOT Monument
5	353870.7667	252364.3841	720+01.55	60.49' L	Rt. 130	Rebar/w cap
6	353826.3279	252238.6073	721+37.31	51.44' L	Rt. 130	Iron Pipe (Disturbed)
7	353816.4999	252239.2835	721+40.88	60.65' L	Rt. 130	Rebar/w cap
8	351276.7376	247367.5501	776+56.87 Bk. 776+66.55 Ah.	0' (Held)	Rt. 130	NJDOT Monument

General Notes

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

A formal traverse was not conducted due to the fact that all horizontal control was established thru a “First-Order GPS Control Survey”.

Only 2 N.J.D.O.T. monuments and 6 property corners were found throughout the project, therefore Panel Points, inlets, guide rail, ends of curb, and the Bridge Deck were used to tie down the Existing Route U.S. Baselines.

## **E. Traffic Engineering**

McCormick Taylor collected manual traffic turning counts in February 2004 at the intersections of Route U.S. 130 with Island Road and Main Street. Classifications of medium and heavy trucks were also collected as part of this count effort. A growth rate of 2.00% was applied to the 2004 base year volumes to obtain 2006 and 2026 design year volumes. Level of Service (LOS) analyses conducted for this highway was performed using the HCS+ 5.21 version of the Highway Capacity Software (HCS) which utilizes the methodology contained in the Highway Capacity Manual. The levels of service for the base year 2006 and design year 2026 have been provided in the Table below.

### **Levels of Service**

Level of Service				
Weekday Peak Hour Route U.S. 130	2006		2025	
	AM	PM	AM	PM
	A	A	A	A

### **1. Traffic Signals**

There are no proposed traffic signals for the project.

### **2. Signing**

All signing applications are derived from the Manual on Uniform Traffic Control Devices. One overhead sign structure will be upgraded.

### **3. Striping**

All striping applications are standard and derived from the Manual on Uniform Traffic Control Services. Standard striping applications include centerlines, lane lines, and edgelines.

### **4. Traffic Control/Staging**

- Construction will be staged to create a minimum amount of disturbance to existing traffic patterns
- No detours are planned for this project.

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

- A reduction to the speed limit is recommended within the project limits.
- There will be a need to reduce the number of lanes to one in each direction of travel on Route U.S. 130 during construction.

## **5. Maintenance of Traffic:**

### **Stage 1**

#### **Stage IA**

Tasks to be completed include the following:

- Set up all traffic control devices and warning signs as shown in the lanes.
- Mill 6 inch and pave 6 inch the NB shoulder area for traffic staging.
- In the north end of the project remove the portion of the median guide rail and install temporary pavement to provide an opening for traffic to cross from southbound travel lanes to northbound left temporary lanes for stage 1B construction.
- In the south end of the project remove the portion of guide rail and build permanent pavement to cross SB traffic on NB left lanes back to the SB side. Install temporary telescoping guide rail end terminal to protect the existing median guide rail.
- Cover / remove / replace the OH sign structure at NB station 58+80 for the new traffic pattern. Restrict Route U.S. 30 northbound traffic to one lane and re-stripe and install construction barrier curb on Route U.S. 130 northbound. Place barrier curb to stop access from Sheets Avenue to Route U.S. 130 northbound.
- Place detour signs to close Island Road during stage II and stage III construction.
- Relocate the gas main along the south bound side of Route U.S. 130.

#### **Stage IB**

- Shift the SB traffic into the NB left lanes using improvements from stage IA. The Route U.S. 130 lane configuration for this stage will be one lane in each direction.
- Construct a portion ( $\pm 32$  ft width section) of the realigned southbound Route U.S. 130 Bridge and approaches. Construct the median barrier on the south side of the bridge.
- Install temporary sheeting in the median and permanent southbound retaining wall to build the road box. Complete all the drainage, retention basins and all roadwork.
- Pave the road up to the intermediate course then install temporary construction barrier next to the temporary sheeting.
- Construct the required crossing for Route U.S. 130 NB traffic to shift to the newly constructed portion of the bridge.

### **Stage 2**

Tasks to be completed include the following:

- Shift Route U.S. 130 traffic pattern to the newly constructed southbound section. Access to Route U.S. 130 northbound to Route 322 eastbound ramps will be maintained.
- Demolish the existing structure, and remove all the piles. Demolish the bridge house and

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

remove all machinery.

- Continue the work on the northbound Route U.S. 130 Bridge and approaches, road box and North bound retaining wall.
- Remove temporary sheeting in the median then construct the median barrier curbs and the permanent northbound retaining wall. Complete all the drainage and all roadwork on Route U.S. 130.
- Construct the road adjacent to Route U.S. 130 northbound and the emergency access road to Route U.S. 130 northbound. Complete the construction of Main Street and Island Road connection and reopen Island Road access to Main Street. Install all permanent guide rails.

## **Stage 3**

Tasks to be completed include the following:

- Shift the traffic back to the outer lanes of the constructed realignment to allow for median construction. Construct the median / barrier curb on the north side of the project.
- Access to Route U.S. 322 eastbound to Route U.S. 130 southbound and the Route U.S. 130 northbound to Route U.S. 322 eastbound will be maintained during Stage III.
- During nighttime/weekend/ off peak hours, pave the surface course, construct permanent traffic striping / markings and all remaining works required for the project.

## **6. Electrical Engineering Design – Highway Lighting Systems**

Highway lighting will consist of continuous freeway lighting along Route 130 beginning at the Route 130 NB barrier at proposed station 27+50. The luminaires will have an alternate spacing type configuration on the Route 130 SB and NB barriers, along the Route 130 Raccoon Creek Bridge parapets and terminating at the Route 130 SB barrier at proposed station 55+50. Two additional luminaires will be placed on new JBF foundations between the end of the Route 130 barriers and the existing Route 130 and Route 322 interchange lighting. A new load center will be located in the vicinity of Main Street and existing Route 130 NB to power the proposed lighting.

The lighting will consist of:

18 – 250 Watt, High Pressure Sodium, conventional type II cutoff luminaires with 15 ft mast arms at 40' height on new aluminum poles mounted on barriers.

2 – 250 Watt, High Pressure Sodium, conventional type II cutoff luminaires with 15 ft mast arms at 40' height on new aluminum poles mounted on junction box foundations.

The highway lighting design has been completed in accordance with Section 11 of the NJDOT Design Manual, the 2007 Sample Plans and TSSE CADD standards.

## **F. Landscape and Urban Design**

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

Context Sensitive Design is incorporated into the project. Architectural treatments of the bridge and retaining walls are proposed. Landscape plans will include naturalized plantings. Given current grading limits, a Reforestation Report will not be needed for this project.

## 1. Soil erosion and sediment control certifications and requirements

Pursuant to the Soil Erosion and Sediment Control Act (NJSA 4:24) a Soil Erosion and Sediment Control Plan has been created for the entire project area that serves to minimize soil erosion and sedimentation during and after project construction. These measures are identified on the Construction Plan documents. All erosion control devices have been designed in accordance with the *NJDOT Soil Erosion and Sediment Control Standards 2008*.

For temporary erosion control during the construction operations, the following will be incorporated:

- Inlet filter protection will be utilized on all proposed inlets that drain disturbed areas.
- Heavy duty orange silt fence will be placed at the toe of all fill slopes. Its purpose is to intercept small amounts of sediment where no concentration of water is expected and no other means of protection is feasible. It also serves as a visible barrier for the protection of sensitive environmental areas outside the limits of proposed work.
- Haybale barriers are proposed at all outlets. This barrier is to stop sediment from entering/ impacting existing waterways.
- Vegetative cover will be placed on all exposed soils to reduce damage from wind and water erosion. Topsoil stabilization matting will be provided if and where directed during construction along steep slopes to provide added stability, if necessary.

Proposed permanent erosion control measures will include the following:

- Riprap Aprons: All proposed riprap channel/outfall stabilization was designed in accordance with the State standards. These erosion control items will remain as permanent control measures.
- Vegetative Cover: Permanent vegetative cover will be placed to stabilize the soil, assuring conservation of soil and water.

## 2. Maintenance issues

Per the new NJDEP Stormwater Management Regulations, all basins, ponds, chambers, and other water quality facilities are required to have an operation and maintenance plan. The maintenance plan for the basins will include the following:

- All basin components must be inspected for clogging and excessive debris and

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall. Such components shall include bottoms, trash racks, outlet structures, and riprap. Sediment removal should take place when the basin is thoroughly dry. Sediment accumulation shall not be allowed to exceed 3".

- Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.
- Erosion occurring in contributory drainage area shall be immediately stabilized to reduce sedimentation.
- Grass should be mowed at least once a month during the growing season. Vegetated areas must be inspected at least annually for erosion and scour. Vegetated areas should also be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the bottom surface and remaining vegetation.
- When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed at least twice annually during both the growing and non-growing seasons. The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.
- All use of fertilizers, mechanical treatments, pesticides, and other means to assure optimum vegetation health must not compromise the intended purpose of the basin. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.
- All structural components must be inspected for cracking, subsidence, spalling, erosion, and deterioration at least annually.
- The sand layer in the infiltration basin shall be tilled annually using light equipment to assist in maintaining infiltration capacity and breaking up clogged surfaces.
- The infiltration area is designed to drain within 72 hours. If the 72 hour maximum drainage time is exceeded, the system's sand bed and groundwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the system.

## **G. Access Design**

### **ACCESS IMPACTS**

The following access impacts are associated with the proposed improvements:

- The construction of the project will eliminate the at-grade intersection of Route U.S. 130 with Island Road and Main Street.
- Island Road and Main Street will access Route U.S. 130 southbound via Barker Avenue and Springers Lane. Island Road and Main Street will connect under the proposed

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

structure of Route U.S. 130 over Raccoon Creek.

- Sheets Avenue intersects Route U.S. 130 within the U.S. Route U.S. 130 northbound to U.S. Route U.S. 322 eastbound deceleration lane. The intersection is in violation on the New Jersey State Highway Access Management Code. The access will be revoked.

## **H. Hydrology & Hydraulics**

### **1. Existing Conditions and Watershed Description**

Raccoon Creek is a State delineated watercourse and is tidal within the project limits. The Route U.S. 130 Bridge is approximately 9000 feet above the mouth of the creek and its confluence with the Delaware River. Based on recent tidal surveys performed, the MHW was determine to be elevation 2.96 feet (NAVD88), and the MLW was found to be -2.46 feet (NAVD88), with a tidal fluctuation of 5.42 feet.

As part of the bridge realignment and reconstruction, the Main Street access from Route U.S. 130 will be eliminated, necessitating a new connector road from Sheets Avenue. With this change and minor shoulder widening on Route U.S. 130, the project will result in approximately 0.5 acres of increased impervious area. In addition, the project will disturb more than 1 acre of land, and compliance with the stormwater management regulations is required.

### **2. Drainage Collection System Design**

To complete this design, digital CADD files containing the existing base map information were utilized. The proposed roadway horizontal and vertical geometry, roadway cross sections, profiles, and typical sections were utilized to obtain grate elevations and proposed drainage patterns.

Drainage design procedures were conducted in accordance with the Department's Drainage Design Manual, and the proposed system was analyzed using the StormCAD software from Bentley. All backup calculations for the stormwater collection and control facilities discussed herein are provided in the reports entitled "Drainage and Soil Erosion and Sediment Control Report prepared for Route U.S. 130 over Raccoon Creek Bridge Replacement", prepared by The RBA Group and dated July 30 2010, and "Flood Hazard Area and Stormwater Management Report prepared for Route U.S. 130 over Raccoon Creek Bridge Replacement", prepared by The RBA Group and dated July 30 2010.

#### **a. Determination of Runoff**

The Rational Method, an empirical formula that relates storm water runoff to rainfall intensity, is appropriate for drainage areas less than two hundred (200) acres. Since all drainage areas to the piping systems within the subject project corridor were less than 200 acres, the Rational Method was utilized. The Rational Method is

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

expressed in the following format:

$$Q = CIA$$

The average rainfall intensity (I) was obtained from New Jersey rainfall-intensity-duration curves for southern NJ utilized by the Department (Figure 3-3 NJDOT Drainage Design Manual). In order to determine the rainfall intensity from the given curves, the time of concentration (Tc) must be determined. This is the time required for storm water runoff to flow from the most remote point in the drainage area to the point of analysis. The time of concentration involves overland (or surface), channel, and/or pipe flow. Overland and/or channel flow time periods were determined using Figure 3-5 of the Department Manual. A minimum Tc of 10 minutes for all flow types was employed. Once the Tc was determined, the rainfall-intensity-duration curves were utilized to determine the rainfall intensity (I).

The rational method runoff coefficients (C), which account for influences such as infiltration, evapotranspiration, surface retention, and interception based upon the existing drainage area surfaces and development characteristics, were determined from the Department's design manual. Weighted values of "C" were calculated based on the percentage of impervious cover for each sub-area, to reflect different conditions within a subject drainage area.

b. Recurrence Interval

A recurrence interval, or average interval between floods of a given duration, was selected for the analysis of pipe systems and inlet efficiency in accordance with Department design standards.

c. Design for Allowable Inlet Spread/Inlet Efficiency

Spread analyses were conducted in order to determine the locations for inlets in accordance with Department spread allowances. Runoff quantity, roadway cross slopes, grade, inlet type, lane configuration and roadway material determine gutter flow capacity. These elements are utilized in an empirical formula (Manning's equation) to compute the gutter flow. At low points, grate inlets function as a weir having a crest length approximately equal to the outside perimeter along which flow enters, thus were analyzed as such. Inlet types associated with proposed improvements include Types B and E.

The following Department allowable spread limits for land service highways were utilized.

Allowable spread = shoulder width plus:

- 1/3 width of ramps, live lanes next to curbs and lanes adjacent to shoulder.
- 1/2 width of acceleration or deceleration lanes.

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

Minimum inlet efficiency, or the amount of water which is intercepted by the inlet compared to the amount of water approaching the inlet ("percent pickup"), was assigned as 75 percent in accordance with Department criteria. Each proposed inlet within the project limits was evaluated for this efficiency. As required by Department criteria, inlets were provided before transitions from normal section to superelevated section along the mainline corridor.

## d. Storm Drains

A pipe system not operating under pressure exhibits flow characteristics as open channel flow. Criteria established by the Department in the design of storm drains included the following:

- Minimum pipe size along main line, 15 inches
- Minimum pipe size along low points, 18 inches
- Manning's "n" value of 0.013 for concrete pipe
- A 10-year recurrence interval along the main line and 15-year at roadway low points
- Coefficient "C" of 0.99 for computing flows of paved surfaces
- Minimum pipe flow velocity, 2.5 ft/s, where feasible

## 3. Floodplain Management Plan Summary

A Floodplain Management Plan has been created for the project area to meet the requirements of NJAC 7:13 - Flood Hazard Area Control Act Rules. All feasible and necessary floodplain management, stormwater management, water quality and soil erosion control measures have been incorporated in the management plan.

### a. Compliance with Engineering Standards

Based on State and FEMA flood mapping for Raccoon Creek, the 100 year tidal flood/flood hazard area elevation is 9.0 feet (NGVD 1929) / 8.3 feet (NAVD 1988). The floodway line shown on the project plans was transposed directly from the State mapping. Under proposed conditions, the bridge opening will be widened and the low chord will be raised. Due to the large span of approximately 300 feet, it is not economically feasible to construct a single span over the watercourse. The number of piers in the channel will remain at two; however, the proposed piers will be moved slightly further away from the center of the channel to accommodate staged construction. This will also provide for more open area through the central portion of the channel.

Since the project lies within a tidal flood hazard area, compliance with the net fill requirements is not required.

Pursuant to NJAC 7:13-11.7,

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

1. The bridge, piers, and its embankments have been designed to remain stable, scour resistant and resistant to displacement and/or damage during any flood event up to and including the flood hazard area design flood. The structure will be placed on piles which will extend much deeper than the required 3 feet below the existing channel invert.
2. The bridge and its associated roadway have been designed to minimize flooding and adverse impacts to channel stability and fishery resources. To help achieve this goal, the bridge opening has been slightly widened to match or exceed the dimensions of the existing channel, so that the size and shape of the natural channel is preserved through the structure.

**b. Riparian Buffer Impacts**

Per N.J.A.C. 7:13-4.1, the riparian zone for this project is 150 feet, since the waterways are not C1, but there is an occurrence of a rare species within 1 mile of the project which is covered by the FHA Control Act Rules.

Permanent impacts in riparian zones will include the construction of the new bridge over Raccoon Creek and the associated removal of native vegetation. There will also be temporary disturbance associated with a reconstructed outfall pipe on the south side of the crossing. Due to construction staging requirements, the new bridge must be constructed offset from the existing roadway, necessitating a larger area of disturbance than that required if the bridge could be constructed over the original bridge footprint. For this reason, the allowable disturbance per Table C of N.J.A.C. 7:13-10.2, will be exceeded and mitigation is required. However, a large section of northbound Route U.S. 130, south of the crossing, will be removed as part of the realignment. Currently, the northbound roadway abuts a tidal flat with numerous fingers tributary to Raccoon creek, effectively reducing the riparian buffer to approximately 50'. In some areas, as much as 35' of pavement will be removed as part of the proposed realignment, creating significant areas of new vegetation and a larger riparian zone. Although a linear infiltration basin is to be located in a portion of this newly created pervious area, there will still be over 40,000 square feet of new vegetation (approximately twice the area required), which overcompensates for disturbances in excess of the allowable. Refer to the table below for a summary of the allowable and proposed disturbances, as well as the areas of newly created riparian vegetation:

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

Project UPC#: 983440

Project #: 0817504

PROPOSED REGULATED ACTIVITY IN RIPARIAN ZONE	MAXIMUM AREA OF VEGETATIVE DISTURBANCE		PROPOSED DISTURBANCE		DISTURB- ANCE IN EXCESS OF ALLOWAB LE	MITIGATION REQUIRED (2:1)
	TEMP.	PERM.	TEMP.	PERM.		
REPLACEMENT OF EXISTING CULVERT (STORMWATER DISCHARGE)	6,000 SF	1,000 SF	3,039 SF	0 SF	0 SF	0 SF
RECONSTRUCTED ROADWAY CROSSING WATER	NA	7,500 SF	0 SF	10,748 SF	3,248 SF	6,496 SF
RECONSTRUCTED ROADWAY NOT CROSSING WATER	NA	3,000 SF	0 SF	10,101 SF	7,101 SF	14,202 SF
TOTALS	6,000 SF	11,500 SF	3,039 SF	20,849 SF	10,349 SF	20,698 SF
MITIGATION PROVIDED VIA IMPERVIOUS COVERAGE REMOVAL	40,439 SF					

## 4. Stormwater Management/Water Quality Plan Summary

As part of this project, 2.06 acres of new impervious coverage will be constructed, 4.10 acres will be reconstructed, and 1.56 acres of existing impervious area will be removed, resulting in a net increase of 0.50 acres. Pursuant to N.J.A.C. 7:8, the new impervious area must be treated at 80% TSS removal, while the reconstructed area must be treated at 50% TSS removal. In addition, since the project is not located in a Metropolitan Planning Area, compliance with the groundwater recharge standards is required.

To address water quality and groundwater recharge, two stormwater management facilities have been designed for this project. On the south/west side of Raccoon Creek, along northbound Route U.S. 130, a linear infiltration basin is proposed where the existing Route U.S. 130 pavement is to be removed. The basin treats approximately 1.9 acres of pavement from the realigned roadway and bridge and is effective in infiltrating the water quality storm, thereby attaining an 80% TSS removal rate. Based on the NJGRS spreadsheet, the basin recharges approximately 15 times the volume of the calculated recharge deficit, greatly exceeding the recharge requirement.

To the north/east of Raccoon Creek, the NJDOT proposes to construct an extended detention basin in an existing ramp infield between eastbound Route U.S. 322 and southbound Route U.S. 130. The basin treats 3.8 acres of new and existing roadway

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

runoff and retains 10% of the peak water quality storm volume 27.4 hours after peak, thereby attaining a 60% TSS removal rate.

As can be seen by the summary table below, these facilities adequately achieve and slightly exceed the water quality requirements for this project:

Impervious Area Within Project Limits		TSS Removal Required	Area x %
	(acres)		
Reconstructed	4.10	50%	2.05
Proposed new impervious area	2.06	80%	1.65
Milled and Overlaid	3.62	0%	0.00
Total	9.78		3.70
<b>TSS Removal Required for Site =</b>			<b>37.8%</b>
Proposed Treatment of Impervious Area		TSS Removal Provided by Facility	Area x %
	(acres)		
Infiltration Basin	1.91	80%	1.53
Extended Detention Basin	3.82	60%	2.29
Remaining Untreated Area	4.05	0%	0.00
Total	9.78		3.82
<b>TSS Removal Provided for Site =</b>			<b>39.0%</b>

Since Raccoon Creek is tidal and there are no structures downstream of the crossing, the standards for runoff quantity do not apply. However, the proposed facilities also provide significant attenuation for all storm events (10% to 20% for the infiltration basin and 50% to 60% for the detention basin), even though not required. Since approximately 4.4 acres of runoff area is being redirected (from direct discharge into the creek) to the Route 322 ramp infield for water quality treatment purposes, an analysis has been performed to confirm that the existing flow in the receiving pipe system will not be exceeded under proposed conditions. With the attenuation provided by the basin, all proposed flows to the existing "E" inlet in the center of the ramp infield are below existing, as summarized on the table:

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

Storm Event	Existing Peak Runoff to Existing Inlet (from 10.8 acre contributing area) (cfs)	Proposed Peak Rate of Inflow to Basin (from 15.21 acre drainage area) (CFS)	Proposed Peak Rate of Outflow to Existing System (CFS)	Reduction in Peak Runoff Rate (CFS)
2	4.72	10.10	4.13	0.59
10	12.28	22.02	12.20	0.08
25	18.45	32.76	16.94	1.51
100	29.21	52.79	29.10	0.11

In summary, all requirements for water quality, groundwater recharge, and peak low are satisfied for this project with the incorporation of the stormwater facilities proposed.

## Specifications

Below is a list of the non-standard drainage items anticipated as part of this contract:

1. **INLET, TYPE DOUBLE B:** This double-wide Type “B” inlet is used at roadway low points when the inlet is placed along curb lines. This inlet configuration provides for added inlet capacity, and also reduces the potential for inlet grate clogging.
2. **OUTLET CONTROL STRUCTURE:** This item includes the cost of converting the existing “E” inlet in the ramp infield to an extended detention basin outlet control structure. The existing structure will be modified to include a low-level orifice, secondary rectangular weir, and trash rack. The inlet grate elevation will also be raised slightly to achieve desired hydraulic properties.
3. **INFILTRATION SAND LAYER, 6” THICK:** This specification describes the requirements for the construction and testing of the Infiltration Sand Layer, associated with the stormwater infiltration basin. The basin will consist of an excavated storage area, with a permeable soil medium (sand) to promote stormwater filtration and recharge into the subgrade soils.
4. **6” POLYVINYL CHLORIDE PIPE (PERFORATED):** The perforated plastic piping will be placed below the surface of the proposed extended detention basin as an underdrain system.

## I. Structures

- i) Proposed Bridge

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

The new bridge is proposed to have a fixed span with a minimum vertical clearance of 25 feet in the navigational channel. The bridge will carry, in each northbound and southbound direction, two 12 feet lanes, one 8 feet right shoulder, and 3 feet left shoulder. The structure will have two standard 1'-9" wide by 2'-10" high New Jersey Concrete Barriers in each bound. The total bridge width out to out of the barriers will be 77'-4".

## **ii) Bridge Elements Selection**

### **1. Design Considerations**

- a) The proposed bridge will be built in two stages. The traffic will be maintained on existing bridge during the initial stage while the western portion of the structure is constructed. Subsequent to the completion of the western portion, the traffic will be shifted to the newly constructed western portion of the bridge. The existing movable bridge will then be demolished and the remaining portion of the structure will be constructed. The bridge will consist of two independent structures separated by a 4 inch open joint in the deck and piers, an expansion joint in the abutment stems, and a contraction joint in the footings.
- b) The existing navigation channel will remain at the same location under the proposed structure.
- c) The abutments will be cast-in-place reinforced concrete full height U-Type abutments.
- d) Piers will be cast-in-place reinforced concrete multi-column bent type on a plinth with a fender system attached to the plinth of each of the two piers in the river.
- e) Standard 25 feet long approach slabs will be constructed at both ends of the bridge.

### **2. Design Alternatives**

#### **a) Bridge Spans**

During the initial span layout determination, the following essential factors were considered:

- Minimize the interference of the existing bridge, including avoiding conflict with existing piles as much as possible.
- Keep the existing navigation channel at the same location.
- Provide a fixed span over navigation channel with a minimum 25'-0" vertical clearance.
- Provide a fixed span over Main Street with a minimum of 14' – 6" vertical clearance.

In order to maintain the location of existing navigation channel and to avoid conflict with existing bridge foundations and river piers, the span length over the navigation channel is set at 130'. This span length was also selected to facilitate staged construction and maintaining traffic. The bottom of the bridge superstructure in this span will be 25' above the Mean High Water (MHW) elevation. The adjacent spans will be 110'-0" feet each to minimize conflict with the existing abutments and to yield an economical span ratio for a continuous structure. The fourth span was selected to be also 110'-0" to clear Main Street/Island Road and for uniformity of the

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

design and appearance. The total length of the bridge between centerline of bearings at the abutments is 460'.

## **b) Bridge Superstructure Alternatives**

Two alternatives are considered for the bridge superstructure. The common criteria for both types is the requirement to keep the profile of the bottom of the superstructure such that it provides 25 feet vertical clearance above MHW in the navigation channel and at least 14'-6" vertical clearance over the Main Street in the north span of the bridge. The alternatives are described as follows:

### **1) Prestressed Concrete Girders**

This alternative is comprised of 9" concrete deck supported on five 72" deep prestressed concrete girders for each northbound and southbound superstructure. Due to the limitation in providing the camber and vertical curve in these beams during fabrication, it is estimated that with 4" to 8" of haunch, this alternative will have a total superstructure depth of 89". The other option would be to flatten the curve to reduce the haunch thickness. In this case the length of the project will interfere with the nearby Route U.S. 322 interchange. In order to keep the existing vertical clearance at the bridge under Route U.S. 322, the profile of Route U.S. 130 must meet the existing grade well before the approach at the underpass. Furthermore, flattening the curve will extend the project limit and hence increase the cost of the project. The beams will be designed as simply supported for dead load and continuous for live load with expansion joints located at both abutments. The required roadway profile to satisfy the clearance requirements described above is 20 inches higher than the steel girder alternative.

### **2) Steel Girders**

This alternative is comprised of 9" concrete deck supported on five 56 3/4" deep steel girders for each northbound and southbound superstructure. It is estimated that with a 3" of haunch, this alternative will have a total superstructure depth of about 69". In order to achieve an economical design and eliminate expansion joints a four span continuous steel beams will be designed with joints located at both abutments. The vertical grades needed for this alternative is 2.720% and - 2.975%.

We compared three steel alternatives, such as Painted Grade 50 steel, Weathering Steel (Grade 50W) and Hybrid Steel (Grade 50W web and Grade 70W flanges). The design of hybrid steel does not provide a significant advantage from section properties aspects and it will cost minimum of \$ 0.20 per pound more than regular steel; therefore this type of steel was not considered for further consideration. As per our discussion with fabricator representatives from High Steel and cost comparison between the other two types of steel alternates, it appears that weathering steel is the preferred alternative for this location. The cost difference between weathering steel and regular painted steel is only \$ 0.05 per pound. Therefore, to eliminate future cost of maintenance painting we are recommending weathering steel for this location.

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

## **3) Comparison of Alternates - PROS and CONS of Alternatives**

### **Prestressed Concrete Girders Alternative**

The vertical grades needed for this alternative is 2.848% and -3.181%. Since the grade of -3.181% is steeper than maximum allowed grade by design manual, a design exception will be required for this substandard feature if we elect to use prestressed concrete superstructure. The total estimated cost of this alternative is \$ 30,178,121.

### **Steel Girders Alternative**

The vertical grades needed for this alternative is 2.720% and -2.975%. The total estimated cost of this alternative is \$ 29,188,767.

- Based on recent economical trend and price swings it appears that there is no clear difference between steel and concrete alternative. However, due to lower profile, steel alternative will cost approximately \$ 989,354 less than the prestressed concrete alternative.
- A temporary access road, west of the new widened bridge will be required to erect new beams. Since the prestressed concrete beams will be almost five times heavier than the steel beams, from a constructability perspective, it will be easier to erect steel beams using lighter cranes in combination with the use of barges. If prestressed concrete beam option is selected it appears that large cranes with long boom, would be required to erect these heavier beams. Also, a more expensive access road combined with pile supported trestle or an erection platform will be required. Transportation of 130 feet long prestressed concrete beams to the bridge site would be difficult and more expensive than transporting the lighter, shorter steel beam sections.
- A weathering steel alternative will provide an aesthetically pleasing, shallow prismatic depth superstructure an important consideration since the existing vertical lift steel bridge is eligible for National Register of Historic Bridges and also, it is located within view shade of adjacent Logan Township historic district. Therefore, it appears that this alternate will be more suitable to reduce adverse effects than the prestressed concrete superstructure.
- Steel alternative will not require any design exception for substandard vertical grades.
- This bridge is located 25 ft. above MHW sufficiently high above marine environment, so that use of weathering steel should not be a concern from environmental/corrosion perspective.
- Weathering steel will provide maintenance free superstructure similar to prestressed concrete beams.
- The steel alternate provides true continuity design for dead and live loads and a better continuity performance over the piers, whereas the prestressed concrete beams provide continuity for live loads only.

## **4) Recommendation**

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

Based on the above discussion and comparison, we recommend using Grade 50W Weathering Steel superstructure alternative for the proposed bridge.

## **A) Bridge Substructure Alternatives**

The substructure consists of two abutments and three piers. The piers are comprised of round columns with column caps. The piers will be provided with a solid concrete plinth. Bridges in the vicinity of the proposed structure, all have piers with round columns so the proposed piers shapes were selected for compatibility in appearance.

The original Subsurface Exploration & Geotechnical Engineering Evaluation Report recommended that the South Abutment, Piers 1 and 2 be founded on piles and the North Abutment and Pier 3 be founded on spread footings.

Upon further studies and review of the report by our consultant, The Louis Berger Group, Inc., the following concerns were raised:

1. The proposed profile will result in approximately 25 feet high embankment at the North Abutment.
2. The soils strata suitable for using spread footings at the North Abutment and Pier No. 3 were found at a depth of approximately 12 to 17 feet respectively below the existing ground surface and within the ground water table. Founding these two substructures at this depth would require substantial quantities of excavation with dewatering and would preclude an economical design.
3. Due to the additional load of 25' fill, the existing ground may experience consolidation over time. Constructing spread footing at North abutment will experience the differential settlement which would have adverse effect on the four span continuous superstructure supported by substructures founded on piles.

The above concerns were brought to the attention of the geotechnical consultant. The geotechnical consultant revised the foundation report to recommend the pile foundation for both pier 3 and North abutment.

Initial scour depth analysis has been made for both the 100 and 500 year flood. These reports indicate a scour depth between 7 feet to 13 feet. The length and design of piles will account for the scour depths, as recommended in the Geotechnical Engineering Report.

Fender systems will be incorporated into the pier designs. Comparisons have been made between the typical dolphin type fender systems and absorption types. The absorption type system is mounted on the side of the piers. This approach will maintain the necessary width of the navigable waterway between the piers. These absorption fender systems are made of synthetic rubber, as such have a longer life than the timber type fender systems. In view of this, the design will incorporate the absorption type fender systems.

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

## **B. Retaining Walls**

The proposed bridge will be constructed at an elevated profile. The retaining walls were selected over the slopes to reduce the Right-of- Way and environmental impact. At the south end of the bridge there will be two 3200 feet long walls, one on each side of the roadway. At the north end of the bridge there will be two 1200 feet long walls. The wall height ranges from 29 feet at the abutments to 7 feet at the lower end.

Cast- in- place reinforced concrete walls are not selected because of higher cost and increased construction duration. The walls being considered include precast modular wall such as T-wall, and Doublewall, as well as Mechanically Stabilized Earth Wall such as Reinforced Earth Wall. As per the Department's guidelines, the contract plans will be prepared to allow for all of the above wall types. The south side walls will be founded on a load transfer mat supported by vibro concrete columns while the North side walls will be directly founded on the embankment. The appearance of the wall, such as texture, color etc. will be in accordance with the requirement of the Cultural Resource Report.

## **C. Overhead Sign Structure**

Existing overhead sign structure on US 130 NB roadway at Sta. 58+80.000 is located within the project limits and does not comply with the current design standards. This sign structure will be impacted due to construction and proposed roadway improvements. This will be replaced with a new overhead sign structure that meets the current standard.

## **J. Design Exception**

A Design Exception report is not required for the project.

## **K. Utility and Railroad Engineering**

Existing underground utilities within the project limits are gas, water and sanitary sewer. Existing overhead utilities include electric, telephone and cable television. To provide for the construction of the project, the following utility facilities will be relocated: gas (directional drilling), sanitary sewer, water, electric, telephone and cable. Underground appurtenances such as manholes and valve covers will be adjusted. At Island Road underneath the proposed bridge, it will be necessary to install electric, cable and telephone underground. The cost for utility relocation is estimated to be 2.0 million dollars.

The following are the names, and addresses for utility contacts for those companies having facilities within the project:

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

TYPE	COMPANY/AGENCY	CONTACT
Electric	Atlantic City Electric	Julius Zaccone Lead Engineer 428 Ellis St. Glassboro, NJ 08028 Tel: (856) 863-7916 Fax: (856) 863-5757
Gas	South Jersey Gas Company	Joseph Schneider, PE 1 South Jersey Plaza Folsom, NJ 08037 Tel: (609) 561-9000 Ext. 4279 Fax no. (609) 704-1802 E-mail: <a href="mailto:Jschneider@SJIndustries.com">Jschneider@SJIndustries.com</a>
Water	New Jersey American Water Company	John Travaglini Sr. Engineer Project Manager 213 Carriage Lane Delran NJ 08075 Tel: 856-824-2568 Fax: 856-764-4331
Cable	Comcast Cable Communications Management, LLC	Jim Parkinson 1846 N.W. Blvd Vineland, NJ 08360 Vineland Comcast Cable. Tel: (609) 280-2202
Telephone	Verizon of New Jersey, Inc	Thomas Reber Engineer 10 Tansboro Road Floor #2 Berlin, NJ 08009 Tel: 856-753-0795 Fax: 856-767-7013
Sanitary/Sewer	Logan Township Municipal Utilities Authority  Consultant	Joe Weber Acting Executive Director P.O. Box 71 Bridgeport, NJ 08014 Tel: (856)-467-1650 Ext. 12 Fax: (856)-467-8551  Charles Hurst, P.E. Branch Manager Metcalf & Eddy, Inc. 1700 Market Street Suite 1700 Philadelphia PA 19103 Tel: 215-399-4322 Fax: 215-399-4371

# ROUTE 130 OVER RACCOON CREEK

Logan Township, Gloucester County

**Project UPC#: 983440**

**Project #: 0817504**

## L. ROW Engineering

As a result of the proposed structure and alignment shift to accommodate the traffic during construction, right-of-way acquisition will be required within the project limits.

There are 8 parcels that will be affected by the project and are identified below. It is noted that a review of the tax maps and ownership data revealed that the remaining area for the contiguous lots owned by the Gloucester County Improvement Authority is in excess of 160 acres and made up of 40 different lots. This very large entire tract will be illustrated on the ETMs and IPMs based upon the Tax Maps information, and without the need to show deed information.

Quadrant	Tax Map	Block	Lot	Owner (N/F)	Acquisition
---	2, 3, 14, 16	---	---	NJDEP (Tidelands)	T & TE Parcels
NW	2	201	25-28, 30	Gloucester Co. Improvement Authority	Fee & Easements
NW	3	306	13	Gloucester Co. Improvement Authority	Fee & Easements
NE	3	305	17, 18	George Jump	Fee & Easements
NE	3	305	18	George Jump	Entire taking
NE	3	307	5	Lois E. Culver	Fee & Easements
NE	3	307	3	Anthony Conte	Fee & Easements
NE	3	307	2	Morton J. Berman	Fee & Easements
SE	14	1403	21, 22	Robert Keller, et ux	Fee & Easements

Anticipated easements include permanent utility easements (UE Parcels) for directional bore of gas main parallel to the ROW line (Sta. 24+00± to 50+50±, Left); temporary construction easements for temporary utility relocations and/or for the 100-ft square boring pit needed for the directional bore (Sta. 50+50±, Left); permanent slope easements; permanent drainage easements, temporary grading easements; temporary site mitigation easements.

The preliminary right-of-way cost estimate is \$308,900.

## M. Jurisdiction

In order to comply with the storm water regulations of quantity, quality and discharge, a storm water management basin will be provided for the project. The Department has determined that the most ideal location for the basin would be the infield area of Ramp "A" (north-west corner of the Route U.S. 322/ Route U.S. 130 interchange). This area is within the Delaware River Port Authority's jurisdiction. Therefore, a jurisdiction agreement will be prepared to enable the Department to maintain jurisdiction, control and maintenance for the basin.

## N. Bicycle/Pedestrian Impacts

Pedestrian and bicycle compatibility is based on the posted speed limit, type of facility and the Average Annual Daily Traffic (AADT), the NJDOT Bicycle Compatible Roadways and Bikeways-Planning and Design Guidelines manual, dated May 1999.

# **ROUTE 130 OVER RACCOON CREEK**

**Logan Township, Gloucester County**

**Project UPC#: 983440**

**Project #: 0817504**

The NJDOT Pedestrian Compatible-Planning and Design Guidelines, dated May 1999, was reviewed in the evaluation of this project.

The guidelines indicate that for a facility with an AADT over 10,000 or a truck percentage over 5%, a posted speed over 50 mph, and located within an urban area, the bicycle compatibility requirements would necessitate a 6 foot shoulder. The portion of Route U.S. 130 within the limits of the project contains 8 foot right shoulders which meets bicycle needs. Sidewalks are not proposed along this portion of Route U.S. 130. Pedestrians are not encouraged to walk adjacent to Route U.S. 130.

## **O. Constructibility**

Traffic will be maintained throughout the duration of the project without the need of detour. However, maintaining all lanes of traffic during construction process is not feasible. There will be a need to provide one lane of traffic in each direction of travel on Route U.S. 130 during the construction of the project. Proper signage and other work zone features will be utilized during all construction stages and phases to insure both workers and motorist safety.

## **P. Construction Cost Estimate**

The initial cost estimate has been completed using the appropriate NJDOT preliminary estimate spreadsheet. The estimated cost of the project is approximately 60 million dollars. See attached spreadsheet for details.

## **Q. Construction Schedule**

A schedule depicting the project schedule is attached.